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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|------------------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 09/966,857 | 09/28/2001 | John Jay Williams | 390086.94901 | 4974 |
| 28382 | 7590 | 01/20/2004 | EXAMINER | |
| QUARLES & BRADY LLP 411 E. WISCONSIN AVENUE SUITE 2040 MILWAUKEE, WI 53202-4497 | | | LEE, SHUN K | |
| | | ART UNIT | PAPER NUMBER | |
| | | | 2878 | |

DATE MAILED: 01/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|----------------------|------------------|----|
| Office Action Summary | Application No. | Applicant(s) | |
| | 09/966,857 | WILLIAMS ET AL. | |
| | Examiner Shun Lee | Art Unit 2878 | MJ |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 28 September 2001.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-20 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) 13-16 is/are allowed.
 6) Claim(s) 1,2,4-8,10-12,17,19 and 20 is/are rejected.
 7) Claim(s) 3,9 and 18 is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on 28 September 2001 is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 13) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
 a) The translation of the foreign language provisional application has been received.
 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- | | |
|----------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s) _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Information Disclosure Statement

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609 A(1) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

Drawings

2. The drawings are objected to because:

- (a) in Fig. 1, reference character "22" does not appear to represent a PMT (see paragraph [0032]);
- (b) in Fig. 4, "Leadign" should probably be --Leading--; and
- (c) in Fig. 4, the lead line originating from "Missed, No Match" does not extend to the feature indicated (see 37 CFR 1.84(q) and paragraph [0013]).

A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

3. The drawings are also objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "1", "2", "3", "4", and "5" has been used to designate both time stamp and EDP. A proposed drawing correction or corrected drawings are

required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

4. The drawings are further objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 13 (paragraph [0037]). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

5. In addition, the drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they include the following reference sign(s) not mentioned in the description: 23 (Fig. 1), 193, 195, 197, -1, -3, and -5. A proposed drawing correction, corrected drawings, or amendment to the specification to add the reference sign(s) in the description, are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

6. The disclosure is objected to because of the following informalities:

- (a) "form" in the third sentence of paragraph [0039] should probably be --from--; and
- (b) "form" in the first sentence of paragraph [0057] should probably be --from--.

Appropriate correction is required.

Claim Objections

7. Claims 17 and 20 are objected to because of the following informalities:

- (a) in claim 17, "counting the event pairs" on line 18 should probably be --a sorter for counting the event pairs--; and

(b) in claim 20, "cycle" on line 4 should probably be --cycle.-- (*i.e.*, each claim begins with a capital letter and ends with a period; see MPEP § 608.01(m)).

Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims 1, 2, 4-8, 10-12, 17, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mertens *et al.* (US 5,241,181) in view of Applicant's Admitted Prior Art.

In regard to claims 7, 10, 11, 17, 19, and 20, Mertens *et al.* disclose (Figs. 1, 2, and 4-6) an apparatus for reducing event loss in a digital time stamped PET scanner including a master clock that has a master clock cycle and an event processing circuit

(27) that divides each clock cycle into a plurality of time stamps (*i.e.*, 8-bit time marker within a sample period; column 4, lines 30-35), the scanner also including coincidence detection circuitry (32) that compares time stamps within each clock cycle to identify coincidence event pairs (column 4, lines 62-65), the apparatus comprising means (e.g., a comparator) for comparing events in the cycle to identify coincidence event pairs; and a sorter (34) for counting the event pairs. For consecutive leading and following master clock cycles, the apparatus of Mertens *et al.* lacks that the cycle is an extended cycle generated by adding (using an extender means) to a second master cycle an overlap period (that includes a beginning or ending adjacent first master cycle portion) identified with the extender means (e.g., an extender) wherein overlap events occurring during the first master cycle overlap period are identified (using a duplicator means) and copied (using the duplicator means) to the extended cycle overlap period. However, applicant admits as Prior Art (paragraph [0057]) that "It should be recognized by those skilled in the art that the process of moving EDPs from one master clock cycle to another is academic and is done routinely already when EDP Q signals are delayed to compensate for processing delays. In fact, because processing delays and corresponding compensation typically are on the order of tens of nanoseconds (e.g. 64 nsec.) and delays of this magnitude are approximately one quarter of a typical clock cycle (e.g., 250 nsec.), often as many as one fourth of all EDPs are already moved from one cycle to the next. Thus, copying of EDPs and time stamps among cycles is a simple matter of system programming". Thus it is clear that as many as one fourth of all EDPs are moved from one master clock cycle to the next is known in the art and routinely

done. Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an extended cycle in the apparatus of Mertens *et al.*, in order to compensate for processing delays.

In regard to claims 1, 4, and 5, the method steps are implicit for the modified apparatus of Mertens *et al.* since the structure is the same as the applicant's apparatus of claims 7, 10, 11, 17, 19, and 20.

In regard to claim 2 which is dependent on claim 1, Mertens *et al.* also disclose (column 6, lines 38-43) that the scanner is used to collect events during a plurality of consecutive clock cycles and wherein the method further includes the step of repeating steps (a) through (e) for each two consecutive clock cycles.

In regard to claim 6 (which is dependent on claim 1) and claim 12 (which is dependent on claim 7), Mertens *et al.* also disclose (column 8, lines 64-67) that the scanner is characterized by a coincidence window (e.g., ± 12.5 ns; column 9, lines 4-6). The method and apparatus of Mertens *et al.* lacks that the overlap period has a duration at least as long as one half the coincidence window. However, applicant admits as Prior Art (paragraph [0057]) that "... processing delays and corresponding compensation typically are on the order of tens of nanoseconds (e.g. 64 nsec.) and delays of this magnitude are approximately one quarter of a typical clock cycle (e.g., 250 nsec.) ... ". Therefore it would have been obvious to one having ordinary skill in the art at the time of the invention to provide an extended cycle (with an overlap period duration such as 64 ns which is at least as long as one half the coincidence window

such as 12.5 ns) in the apparatus of Mertens *et al.*, in order to compensate for processing delays.

In regard to claim 8 which is dependent on claim 7, Mertens *et al.* is applied as in claim 2 above.

Allowable Subject Matter

11. Claims 13-16 are allowed.
12. Claims 3, 9, and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
13. The following is a statement of reasons for the indication of allowable subject matter: the instant application is deemed to be directed to an nonobvious improvement over the invention patented in US Patent 5,241,181. The improvement comprises in combination with other recited elements, determining if both events in the pair occur during the overlap period and, where both events occur during the overlap period, skipping the step of counting the event pair.

Conclusion

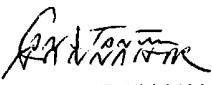
14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (703) 308-4852. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


CONSTANTINE HANNAHER
PRIMARY EXAMINER
GROUP ART UNIT 2878

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